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10/813,758	03/31/2004	Samit Kumar Basu	140361-1/YOD GERD:0123	5263

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EXAMINER	
BITAR, NANCY	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
08/30/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/813,758	BASU ET AL.	
	Examiner	Art Unit	
	NANCY BITAR	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *12-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *12-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's response to the last Office Action, filed 3/19/2010, has been entered and made of record.

2. Claims 12-30 are currently pending.

3. Applicants arguments filed 6/18/2010 have been fully considered and are not persuasive.

4. Applicant argues that the burden of establishing a prima facie case of obviousness fails on the examiner and that the reference teaches away from their combination and the references is not based on objective evidence of record. Additionally the applicant argues that Shih and Liang do not disclose ' generating a variance map from measured projection data from the tomography system and formulating a variance measure based upon the measured projection data and generating the variance map from the variance measure using a reconstruction algorithm. Moreover, the noise distribution of the projection data has an approximate Gaussian functional instead of usually assumed Poisson distribution.

In response, Shih teaches Variance projections of the variations between the object and standard projections (same object) for particular perspectives are generated. Variant portions of the variance projections are identified and used to generate a 3D reconstruction of just the variations between the object and the standard. The 3D reconstruction can then be evaluated to qualify the object (see abstract) .Note that Shih clearly teaches that in paragraph[0045] that the standard projection can be considered the measured projection where graphical user interface can provide variance data to the operator. For example, a graphics generator of the numerical analyzer 470 can superimpose the variance reconstruction of the variations over a stored 3D reconstruction of

the standard to provide the operator with a visual indication of the differences between the object and the standard. The composite of the standard and variance reconstructions can be enhanced, for example through the use of colors or shading, to highlight defects for the operator. It will be appreciated that such graphics can also be displayed while object qualification is being determined automatically by the numerical analyzer 470. Moreover, the variance map can be based on identifying variant portions can include describing the locations of the variant portions within the intensity maps. In some of these latter embodiments, describing the location of the variant portion can include identifying pixels that define a perimeter of the variant portion [paragraph [0011]. Additionally the examiner used a secondary reference Liang et al to teach the generation of variance map with use of variance measure. In figure 5B the graph shows a variance mean curve using variance measurement wherein a uniform variance to all pixels is being assigned. The examiner interprets the variance map as the variance curve that is being used with the FBP reconstructive procedure which is the fastest image reconstruction technique. Applicant argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e: the measured projection data are Poisson random variables.) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally the applicant's argument that the combination of all the features recited in claims 1-14 makes the applicant's invention patentable different is not found persuasive and thus Shih and Liang still reads on the applicant's claimed invention. In response to applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the examiner recognizes that obviousness

may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, generating a variance map as taught by Liang with the measured projection data using a reconstruction method in order to reduce radiation and useful image are formed from these measured projection data .All remaining arguments are reliant on the aforementioned and addressed arguments and thus are considered to be wholly addressed herein.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 23 February 2010), Annex IV, reads as follows:

The USPTO recognizes that applicants may have claims directed to computer readable media that cover signals per se, which the USPTO must reject under 35 U.S.C. § 101 as covering both non-statutory subject matter and statutory subject matter. In an effort to assist the patent community in overcoming a rejection or potential rejection under 35 U.S.C. § 101 in this situation, the USPTO suggests the following approach. A claim drawn to such a computer readable medium that covers both transitory and non-transitory embodiments may be amended to narrow the claim to cover only statutory embodiments to avoid a rejection under 35 U.S.C. § 101 by adding the limitation "non-transitory" to the claim. Cf. Animals - Patentability, 1077 Off. Gaz. Pat. Office 24 (April 21, 1987) (suggesting that applicants add the limitation "non-human" to a claim covering a multi-cellular organism to avoid a rejection under 35 U.S.C. § 101). Such an amendment would typically not raise the issue of new matter, even when the specification is

silent because the broadest reasonable interpretation relies on the ordinary and customary meaning that includes signals per se. The limited situations in which such an amendment could raise issues of new matter occur, for example, when the specification does not support a non-transitory embodiment because a signal per se is the only viable embodiment such that the amended claim is impermissibly broadened beyond the supporting disclosure. See, e.g., Gentry Gallery, Inc. v. Berkline Corp., 134 F.3d 1473(Fed. Cir. 1998).

Claim(s) 29 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 29 defines a "computer readable medium" embodying functional descriptive material. However, the claim does not define a non-transitory computer-readable medium or memory and is thus non-statutory for that reason (i.e., "examination the pending claims must be interpreted as broadly as their terms reasonably allow). The broadest reasonable interpretation of a claim drawn to a computer readable medium (also called machine readable medium and other such variations) typically covers forms of non-transitory tangible media and transitory propagating signals per se in view of the ordinary and customary meaning of computer readable media, particularly when the specification is silent. See MPEP 2111.01. When the broadest reasonable interpretation of a claim covers a signal per se, the claim must be rejected under 35 U.S.C. § 101 as covering non-statutory subject matter. See In see Official Gazette Notice 1351 OG212, February 23, 2010). That is, the scope of the presently claimed "computer readable medium" typically covers forms of non-transitory tangible media and transitory propagating signals *per se*. The examiner suggests amending the claim to embody the program on a "non-transitory computer readable medium" to the claim or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 12-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih et al (US 2005/0152504) in view of Liang et al (US 7,187,794)

As to claim 12, Shih teaches a method for generating a variance map from measured projection data acquired from a tomography system comprising:

Accessing the measured projection data from the tomography system (A tomography system 100 comprises an imaging system 102; note that figure 3 teaches acquire an object projection of an object; 310); formulating a variance measure based upon the measured projection data (generating the variance reconstruction from the variance projections, paragraph [0010]); and generating a variance map from the variance measure using a reconstruction algorithm (the variance projection includes an intensity map and positional data for the perspective that is common to the standard and object projections; note that 3D variance reconstruction of the variations between the object and the standard is generated, and the object is qualified based on the variance reconstruction, Paragraph [0043])While Shih meets a number of the limitations of the claimed invention, as pointed out more fully above, Shih fails to specifically teach the

variance map has been generated from variance measure. Specifically, Liang et al teaches treating noise in low-dose CT projections and reconstructed images. The method comprises generating a curve for variance and means given a set of raw data, fitting the curve by a functional form, and determining, for a fitted curve, a transformed space having substantially constant variance for all means. The method further comprises applying a domain specific filter in a sinogram domain of the set of raw data, and applying an EPS filter in an image domain of the set of raw data after filtering in the sinogram domain (see abstract figure 5 and figure 9). .it would have been obvious to one of ordinary skill in the art to generating a variance map as taught by Liang with the measured projection data using a reconstruction method in order to reduce radiation and useful image are formed from these measured projection data since one would have been motivated to make such modification to reduce artifact thus improving image quality. Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

As to claim 13, Shih teaches determining variability of a mean pixel value caused by noise factors and artifact factors associated with the measured projection data based upon the variance measure (any pixel in the variance projection intensity map that exceeds a particular threshold value can be a variant portion. Alternatively, a variant portion can be defined as any portion of the intensity map in which a threshold number of pixels within a given area each exceed threshold intensity. Threshold values, for example, can be fixed values or can be set by a user to vary the sensitivity. It will be appreciated that more complex algorithms can also be applied to identify variant portions, paragraph [0037]; figure 4; see also Liang figure 2 and column 12 lines 58- column 13 lines 1-66).

As to claim 14, Shih teaches the method of claim 12, wherein formulating a variance measure is based on a statistical model (figure 4, 450,460,470; it is known to one skilled in the art that the numerical analyzer can include statistical model; see Liang figure 2 and column 3 lines 1-65).

As to claim 15, Liang et al teaches the method of claim 12, wherein the reconstruction algorithm is a weighted filtered back projection reconstruction algorithm or a fast reconstruction algorithm such as a Fourier-based algorithm, a hierarchical algorithm, or a coarse reconstruction based on down sampled projection data and/or image data (column 5 line 57-column 6 lines 1-17)

As to claim 17, Shih et al teaches the method of claim 15, wherein the reconstruction algorithm is adapted to operate on the variance measure to generate the variance map (It will be appreciated that more complex algorithms can also be applied to identify variant portions, paragraph [0037])

As to claim 18, Shih teaches the method of claim 12 further comprises displaying, analyzing or processing the variance map (figure 4, numerical analyzer; see Liang et al (figure 8A-8C).

As to claim 19, Shih teaches the method of claim 12, wherein the measured projection data is reconstructed to generate original image data and wherein the original image data is displayed or analyzed based upon or in conjunction with the variance map (a graphical user interface can provide variance data to the operator. For example, a graphics generator of the numerical analyzer 470 can superimpose the variance reconstruction of the variations over a

stored 3D reconstruction of the standard to provide the operator with a visual indication of the differences between the object and the standard, paragraph [0045]).

As to claim 20, Shih teaches the method of claim 12, further comprising identifying features of interest in the original image data based upon the variance map (identify variant portions of the variance projection, 340; figure 3).

The limitation of claims 21-24 has been addressed in claims 12-15

The limitation of claim 25 has been addressed in claim 17.

As to claim 26, Shih et al teaches the method of claim 21, wherein the measured projection data is reconstructed to generate original image data and wherein the original image data is displayed analyzed or processed based upon the variance map (a graphical user interface can provide variance data to the operator. For example, a graphics generator of the numerical analyzer 470 can superimpose the variance reconstruction of the variations over a stored 3D reconstruction of the standard to provide the operator with a visual indication of the differences between the object and the standard. The composite of the standard and variance reconstructions can be enhanced, for example through the use of colors or shading, to highlight defects for the operator. It will be appreciated that such graphics can also be displayed while object qualification is being determined automatically by the numerical analyzer 470, paragraph [0045]; figure 5; see also Man et al figure 1 and 6).

The limitation of claim 27 has been addressed in claim 20.

The limitation of claim 28 has been addressed above on that claim 18 is a system claim whereas claim 1 is a method claim .Therefore; claim 28 is analyzed as previously discussed.

The limitation of claims 29 and 30 has been addressed above

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/
Examiner, Art Unit 2624

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